**Tribhuvan University**
**Institute of Science and Technology**
**Model Question Paper**

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| Bachelor Level/ First Year/ Second Semester/ Science | Full Marks: 60 |
| **Computer Science and Information Technology (CSC. 154)** | Pass Marks: 24 |
| (Data Structure and Algorithm) | Time: 3 hours. |

*Candidates are required to give their answers in their own words as for as practicable.*

The figures in the margin indicate full marks.

## Section A

**Attempt any TWO questions.** (2x10=20)

1. Describe using an example, how an arithmetic expression can be represented using a binary tree. Once represented, how can the expression be output in postfix notation?
2. Define stack as an ADT. Explain the condition that is to be checked for Push and Pop operations when stack is implemented using array?
3. Explain the advantages and disadvantages of representing a group of items as an array versus a linear linked list with suitable examples.

## Section B

**Attempt any EIGHT questions.** (8x5=40)

4. Explain the difference between structure and union.
5. What is Big-O notation? Analyze the efficiency of quick sort.
6. Determine what the following recursive C function computes. Write an iterative function to accomplish the same purpose.

```
int func(int n)
{
  if (n==0)
       return (0);
  return (n+func(n-1));
} /*end func*/
```

7. Explain the concept of priority queue with an example.
8. Illustrate the sequential search with suitable example.
9. Write a non recursive depth-first traversal algorithm.
10. Write and explain the algorithm for Tower of Hanoi.
11. What is hashing? Explain the terms hash collision.
12. Explain why the straight selection sort is more efficient than the bubble sort.
13. Explain different types of binary tree.

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